

How to Measure and Report Winter Precipitation

Snowfall, snow depth and their water equivalent are some of the most difficult, but important, weather elements to measure accurately and consistently. In the warm season, it is easy to forget what needs to be measured and how. While these instructions were originally intended for cooperative weather observers, the NWS can always use snow information from EVERYONE. Even if you cannot provide snow water equivalent observations, snowfall and snow depth data is very important to us.

When calling or emailing your snow information, please also include the following:

- Name
- Location (if not in a town, use terms like "6 miles south of Bishop")
- Time of your event (i.e. when the snow began and ended, etc)
- Elevation (if known)

Preparation

At your manual rain gauge, remove the funnel and inner measuring tube so the 8-inch diameter overflow can will accurately catch frozen precipitation. If there are leaks in the can, call us and we will repair or replace it. Put your snow board(s) out and mark the location so it can be found after a new snowfall.

Now you are prepared for taking snowfall measurements. Here are the three critical measurements when reporting solid precipitation:

1. **Water equivalent**: the water amount within the snowfall, since the previous observation;
2. **Snowfall**: depth of snow, sleet, or snow pellets since the previous observation;
3. **Snow depth**: total depth of snow on the ground at the normal observation time.

• **Water Equivalent**:

Measured once a day at your specified time of observation. Melt the contents of your gauge (by bringing it inside your home or adding a measured amount of warm water) and then pour the liquid into the smaller inner measuring tube and measure the amount to the nearest .01 inch just as you do for measuring rainfall. If you added a measured amount of warm water to the gauge to melt the snow, then accurately remove the measured amount of added water before measuring the water equivalent.

But it is not always that simple. As winds increase, your gauge will collect less and less of the precipitation that actually falls. Generally speaking, the stronger the wind and the drier the snow, the less is captured in the gauge. If you notice that less snow is in the gauge than accumulated on the ground, first empty any existing snow from inside the 8-inch cylinder, then use it to take a snow sample, sometimes referred to as "take a core" or "cut a biscuit" from your snow board with the 8-inch overflow can. Melt the biscuit of snow, pour the liquid into the small measuring tube to measure the water equivalent.

• **Snowfall**:

The greatest amount of snowfall that has accumulated on your snowboard (or ground if board is not available) since the previous snowfall observation. This measurement should be taken at least once-a-day and should reflect the greatest accumulation of new snow observed (in inches and tenths, for example, 3.9 inches) since the last snowfall observation. Since you are not available to watch snow accumulation at all times of the day and night, use your best estimate, based on a measurement of snowfall at the scheduled time of observation along with knowledge of what took place during the past 24 hours. If your observation is not based on a measurement, record in your remarks that the "snow amount based on estimate". Remember, you want to report the greatest accumulation since the last observation.

If snowfall occurred several times during the period, and each snowfall melted either completely or in part before the next snowfall, record the total of the greatest snow depths of each event and enter in your remarks "snowfall melted during the OBS period". For example, three separate snow events during your 24-hour reporting day, say 3.0, 2.2, and 1.5 inches. The snow from each event melts off before the next accumulation and no snow is on the ground at your scheduled time of observation. The total snowfall for that reporting 24-hour day is the sum of the three separate snow falls, 6.7 inches, even though the snow depth on your board at observation time was zero.

Snow often melts as it lands. If snow continually melts as it lands and the accumulation never reaches 0.1 inches on your measuring surface, record the snowfall as a trace (T), and record in your remarks that the "snow melted as it landed".

It is essential to measure snowfall (and snow depth) in locations where the effects of blowing and drifting are minimized. Finding a good location where snow accumulates uniformly. In open areas where windblown snow cannot be avoided, several measurements may often be necessary to obtain an average depth. The measurements should not include the largest drifts. In heavily forested locations, try to find an exposed clearing in the trees. Measurements beneath trees are inaccurate because large amounts of snow can accumulate on trees and never reach the ground.

- **Snow Depth:**

The total depth of snow, sleet, or ice on the ground, taken once a day at the scheduled time of observation with a measuring stick. Measure the total depth of snow on exposed ground at a permanently mounted snow stake, or by taking the average of several depth readings at or near the normal point of observation with a measuring stick. When using a measuring stick, insure the stick is resting on the ground, not on a layer of ice or crusted snow. The measurement should reflect the average depth of snow, sleet, and glaze ice on the ground at your usual measurement site (not disturbed by human activities). Don't take measurements from rooftops, paved areas, etc.

Report snow depth to the nearest whole inch, rounding up when one-half inch increments are reached (example 0.4 inches gets reported as a trace (T), 3.5 inches gets reported as 4 inches). Frequently, in hilly or mountainous terrain, you will be faced with the situation where no snow is observed on south-facing slopes while snow, possibly deep, remains in shaded or north-facing areas. Under these circumstances, you should use good judgment to visually average and then measure snow depths in exposed areas within several hundred yards surrounding your weather station. For example, if half the exposed ground is bare and half is covered with 6 inches of snow, the snow depth should be entered as the average of the two readings, or 3 inches. When, in your judgment, less than 50 percent of the exposed ground is covered by snow, even though the covered areas have a significant depth, the snow depth should be recorded as a trace (T). When no snow or ice is on the ground in exposed areas (snow may be present in surrounding forested or otherwise protected areas), record a "0".

When strong winds have blown the snow, take several measurements where the snow was least affected by drifting and average them. If most exposed areas are either blown free of snow while others have drifts, again try to combine visual averaging with measurements to make your estimate.